REMARKS

Reconsideration of the application in view of the above amendments and the following remarks is requested. Claims 16-30 are in this application. Claims 1-10 and 12-15 have been cancelled. (Claim 11 was previously cancelled.) Claims 16 and 17 have been amended. Claims 19-30 have been added to alternately and additionally claim the present invention.

The Examiner rejected claims 1-10 and 12-14 under 35 U.S.C. §112(b), first paragraph. The Examiner also rejected claims 1-3, 5, 8, 10 and 12-13 under 35 U.S.C. §102(b) as being anticipated by Brown (U.S. Patent No. 5,939,767). The Examiner additionally rejected claims 15-16 under 35 U.S.C. §102(b) as being anticipated by Wei et al. (U.S. Patent No. 5,843,813). The Examiner further rejected claims 4, 6, 7, and 9 under 35 U.S.C. §103(a) as being unpatentable over Brown. As noted above, claims 1-10 and 12-15 have been cancelled. Claim 16 has been amended to depend from claim 17.

The Examiner also rejected claims 17-18 under 35 U.S.C. §103(a) as being unpatentable over Wei. For the reasons set forth below, applicant respectfully traverses this rejection.

Claim 17, which depended from claim 15, has been amended to be in independent form, and recites, in part,

> "an isolation region formed in the semiconductor material;
> "a first region of a second conductivity type . . .;
> "a well region of the second conductivity type . . .;and
> "a second region of the first conductivity type formed in the well region, the second region contacting the isolation region and . . . being connected to an electrical pad."

In rejecting the claims, the Examiner pointed to a field oxide region shown in FIG. 20 of Wei as constituting the isolation region of the claims, and n+ region 256 as constituting the first region of the claims. In addition, the Examiner pointed to n-well 292 shown in FIG. 20 of Wei as constituting the well region of the claims, and p+ region 252 as constituting the second region of the claims. (See page 4 of the office action.)

In addition to the above, claim 17 has been further amended to recite:

"the first region and the second region lying on opposite sides of the isolation region."

As noted above, claim 17 requires that the second region contact the isolation region. Since the Examiner has read p+ region 252 to be the second region, then the Examiner must be reading the far right field oxide region shown in FIG. 20 of Wei to be the isolation region required by claim 17 because p+ region 252 does not contact the central or far left field oxide regions.

However, if the far right field oxide region is read to be the isolation region of the claims, then the Wei reference does not teach or suggest that the first and second regions lie on opposite sides of the isolation region as required by claim 17. As shown in FIG. 20, Wei teaches that p+ region 252 and n+ region 256 both lie on the left side of the far right isolation region. As a result, p+ region 252 can not be read to be the second region of claim 17.

Since p+ region 252 can not be read to be the second region of claim 17, claim 17 is patentable over Wei when p+ region 252 is read to be the second region of claim 17. Further, since claims 16 and 18-20 depend either directly or indirectly from claim 17, claims 16 and 18-20 are patentable over Wei for the same reasons as claim 17.

In addition, applicant also notes that p+ region 250b can not be read to be the second region of claim 17 because the Wei reference does not teach or suggest that p+ region 250b is connected to a pad. In rejecting claim 17, the Examiner noted that FIG. 20 does not teach that the second region (p+ region 252) is connected to an electrical pad, but argued that it would be obvious to do so in view of FIG. 18 of Wei.

FIG. 18 of Wei shows a schematic diagram that illustrates a PMOS transistor with a gate, a source connected to VDD, and a drain connected to a node N6. FIG. 18 of Wei also shows an NMOS transistor with a gate, a source connected to ground, and a drain connected to node N6. In the office action, the Examiner appears to argue that it would be obvious to connect p+ region 252 shown in FIG. 20 of Wei to VDD, and n+ region 256 shown in FIG. 20 of Wei to ground in order to operate the device shown in FIG. 18 of Wei.

This argument, however, does not apply to p+ region 250b because one skilled in the art would not be motivated to connect p+ region 250b to VDD to implement the circuit shown in FIG. 18 of Wei. It is important to note that the issue is not whether one skilled in the art would understand that p+ region 250b could be connected to VDD. Rather, the issue is whether one skilled in the art would be motivated to make the connection.

In the present situation, one skilled in the art would not be motivated to connect p+ region 250b to VDD to implement the circuit shown in FIG. 18 of Wei because such a connection would lead to an inefficient interconnect layout. As shown in FIG. 18 of Wei, the drains of the PMOS and NMOS transistors must be connected together to implement the circuit. If n+ region 250a and p+ region 250b shown in FIG. 20 of Wei are read to be the drains of the NMOS and PMOS transistors, respectively, then only a short local interconnect or metal-1 trace (and contacts) is needed to connect the two regions together.

On the other hand, if n+ region 250a and p+ region 252 shown in FIG. 20 of Wei are read to be the drains of the NMOS and PMOS transistors, respectively, then a much longer and more complex local interconnect or metal-1 trace must be used to make the connection. Thus, one skilled in the art would not be motivated to connect p+ region 250b to VDD to implement the circuit shown in FIG. 18 of Wei because one skilled in the art would not be motivated to use a local interconnect or metal-1 trace that is much longer and more complex than is needed. As a result, p+ region 250b can not be read to be the second region of claim 17.

Thus, since p+ regions 250b and 252 can not be read to be the second region of claim 17, claim 17 is patentable over the Wei et al. reference. In addition, since claims 16 and 18-20 depend from claim 17, claims 16 and 18-20 are patentable over the Wei et al. reference for the same reasons as claim 17.

New claim 21 recites, in part,

> "an isolation region formed in the semiconductor material;
> "a first region of a second conductivity type formed in the semiconductor material . . . ;
> "a well region of the second conductivity type formed in the semiconductor material, the well region contacting the isolation region, being spaced apart from the first region . . . ; and

> "a second region of the first conductivity type formed in the well region, the second region contacting the isolation region and having a dopant concentration, the second region being connected to an electrical pad, the first region being positioned such that no other region having the first conductivity type and a dopant concentration greater than the well region lies between the first region and the isolation region."

New claim 24 recites similar limitations.

Since claims 21 and 24 recite that the first region is "positioned such that no other region having the first conductivity type and a dopant concentration greater than the well region lies between the first region and the isolation region," n+ region 256 shown in FIG. 20 of Wei can not be read to be the first region because n+ region 250a lies between n+ region 256 and the isolation region, regardless of whether the isolation region is read to be the center or far right isolation region.

Since n+ region 256 can not be read to be the first regions of claims 21 and 24, claims 21 and 24 are patentable over Wei when n+ region 256 is read to be the first regions of claims 21 and 24. Further, since claims 22-23 depend either directly or indirectly from claim 21, claims 22-23 are patentable over Wei for the same reasons as claim 21. In addition, since claims 25-30 depend either directly or indirectly from claim 24, claims 25-30 are patentable over Wei for the same reasons as claim 24.

In addition, applicant also notes that n+ region 250a can not be read to be the first regions of claims 21 and 24 because the Wei reference does not teach or suggest that n+ region 250a is connected to ground. In this case, one skilled in the art would not be motivated to connect n+ region 250a to ground to implement the circuit shown in FIG. 18 of Wei because such a connection would again lead to an inefficient interconnect layout.

As noted above, the drains of the PMOS and NMOS transistors shown in FIG. 18 of Wei must be connected together to implement the circuit. If n+ region 250a and p+ region 250b shown in FIG. 20 of Wei are read to be the drains of the NMOS and PMOS transistors, respectively, then only a short local interconnect or metal-1 trace (and contacts) is needed to connect the two regions together.

On the other hand, if n+ region 256 and p+ region 252 shown in FIG. 20 of Wei are read to be the drains of the NMOS and PMOS transistors, respectively, then a much longer and more complex local interconnect or metal-1 trace must be used to make the connection.

Thus, one skilled in the art would not be motivated to connect n+ region 250a to ground to implement the circuit shown in FIG. 18 of Wei because one skilled in the art would not be motivated to use a local interconnect or metal-1 trace that is much longer and more complex than is needed. As a result, n+ region 250a can not be read to be the first regions of claims 21 and 24.

Thus, since n+ regions 250a and 256 can not be read to be the first regions of claims 21 and 24, claims 21 and 24 are patentable over the Wei et al. reference. In addition, since claims 22-23 depend from claim 21, claims 22-23 are patentable over the Wei et al. reference for the same reasons as claim 21. Further, since claims 25-30 depend from claim 24, claims 25-30 are patentable over the Wei et al. reference for the same reasons as claim 24.

Thus, for the foregoing reasons, it is submitted that all of the claims are in a condition for allowance. Therefore, the Examiner's early re-examination and reconsideration are respectively requested.

Respectfully submitted,

Dated: 3-12-03 By: Mark C. Pickering

Mark C. Pickering
Registration No. 36,239
Attorney for Assignee

P.O. Box 300
Petaluma, CA 94953-0300
Direct Dial Telephone No. (707) 762-5583
Telephone: (707) 762-5500
Facsimile: (707) 762-5504

APPENDIX

In the Claims

Please cancel claims 1-10 and 12-15. (Claim 11 was previously cancelled.)

Please amend the claims as follows:

16. (Amended) The structure of claim [15] 17 wherein the semiconductor material has a dopant concentration that is less than the dopant concentration of the second region.

17. (Amended) [The structure of claim 15 wherein] An ESD protection structure formed in a semiconductor material of a first conductivity type, the structure comprising:

an isolation region formed in the semiconductor material;

a first region of a second conductivity type formed in the semiconductor material, the first region having a dopant concentration;

a well region of the second conductivity type formed in the semiconductor material, the well region contacting the isolation region, being spaced apart from the first region, having a dopant concentration that is less than the dopant concentration of the first region, and not contacting a region of the second conductivity type that has a dopant concentration that is greater than the dopant concentration of the well region; and

a second region of the first conductivity type formed in the well region, the second region contacting the isolation region and having a dopant concentration, the first region and the second region lying on opposite sides of the isolation region, the second region [is] being connected to an electrical pad.

Claims 19-30 have been added.